DOCUMENT RESUME

ED 191 939 UD 020 819

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TITLE What Makes Sammy Run?: An Empirical Assessment of the Bowles-Gintis Correspondence Theory.
INSTITUTION Wisconsin Univ., Madison. Inst. for Research on Poverty.
REPORT NO IRP-DP-574-79
PUB DATE Oct 79
NOTE 56p.

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Academic Achievement; Adults; Educational Attainment; Elementary Secondary Education; *Employment Level; Higher Education; Income; *Individual Characteristics; Males; Parent Background; *Personality Traits; *School Role; *Socioeconomic Status; Theories
IDENTIFIERS *Bowles Gintis Correspondence Theory

ABSTRACT

The Bowles-Gintis correspondence theory rejects conventional theories that stress the role of cognitive skills in explaining the link between educational attainment and occupational status or earnings. Bowles and Gintis propose that schools serve primarily to develop noncognitive characteristics necessary to the reproduction of the social relations of production in a capitalist economy. In this paper, Olneck's Kalamazoo Brothers data are used to test the Bowles-Gintis correspondence theory. The data include tenth grade homeroom teachers' ratings on nine personality or behavioral measures, sixth grade aptitude test scores, tenth grade English marks, measures of family background, initial and current occupational status, and 1973 earnings for a sample of 35 to 59 year old males. Findings indicate that the empirical predictions of the correspondence theory are unsupported. Critics of what Bowles and Gintis label the "technocratic-meritocratic" model of achievement would fare better by questioning the model's explanatory and interpretive premises than by disputing its empirical predictions. (Author/MK)

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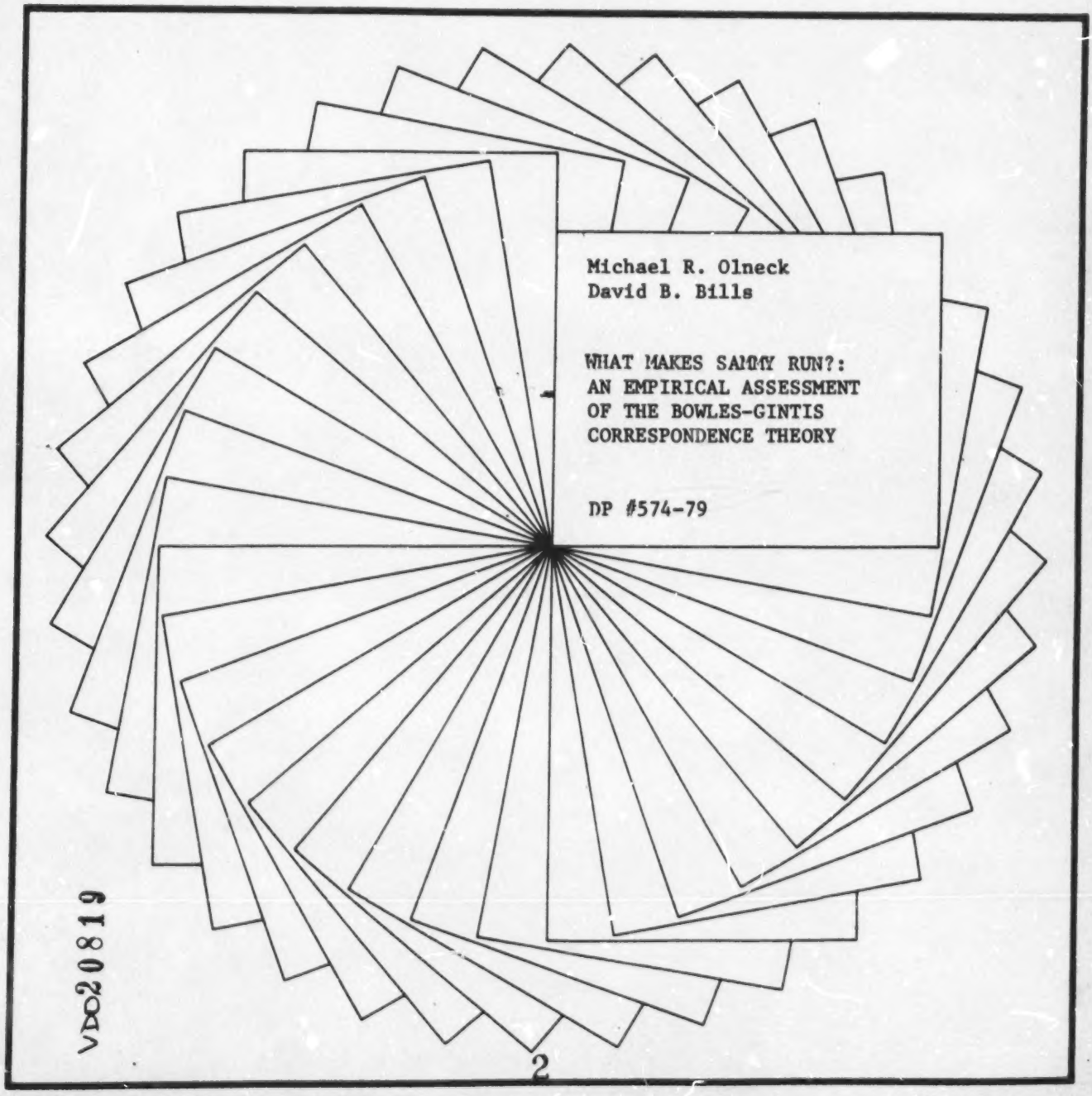

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WHAT MAKES SAMMY RUN?:
AN EMPIRICAL ASSESSMENT
OF THE BOWLES-GINTIS
CORRESPONDENCE THEORY

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VD020819

What Makes Sammy Run?: An Empirical Assessment of the Bowles-Gintis Correspondence Theory

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October 1979

This research was funded in part by funds granted to the Institute for Research on Poverty pursuant to the Economic Opportunity Act of 1964. We are grateful to Michael Apple, James Crouse, and Christopher Jencks for comments on an earlier draft, and to Chuck Halaby for technical advice.

ABSTRACT

The Bowles-Gintis correspondence theory, advanced by Samuel Bowles and Herbert Gintis in Schooling in Capitalist America: Educational Reform and the Contradictions of Economic Life (New York: Basic Books, 1976), rejects conventional explanations that stress the role of cognitive skill in explaining the link between educational attainment and occupational status or earnings. According to Bowles and Gintis, schools do not serve primarily to enhance or certify cognitive skills necessary for the technically efficient performance of occupational roles; instead, they serve primarily to develop noncognitive characteristics necessary to the reproduction of the social relations of production in a capitalist economy. From their theory, Bowles and Gintis explicitly advance or imply several empirical propositions. These include:

(a) Holding constant relevant noncognitive traits will reduce the apparent relationship between years of schooling and economic success.

(b) Holding constant measures of cognitive skill will not reduce the apparent relationship between years of schooling and economic success, except insofar as cognitive and noncognitive characteristics are related.

(c) The noncognitive characteristics which schools reward, for example with higher grades, are the same characteristics the labor market rewards.

Working with Olneck's Kalamazoo Brothers data, which include tenth-grade homeroom teachers' ratings on nine personality or behavioral measures, sixth-grade aptitude test scores, tenth-grade English marks, measures of family background,

initial and current occupational status, and 1973 earnings for a sample of 35-to-59-year-old males, we test the Bowles-Gintis correspondence theory and find its empirical predictions unsupported. We conclude by suggesting that critics of what Bowles and Gintis label the "technocratic-meritocratic" model of achievement would fare better by questioning the model's explanatory and interpretive premises than by disputing its empirical predictions.

What Makes Sammy Run? An Empirical Assessment of the Bowles-Gintis Correspondence Theory

In their recent book, Schooling in Capitalist America (New York: Basic Books, 1976), Samuel Bowles and Herbert Gintis reject conventional explanations which emphasize the importance of cognitive skills for producing the observed association between educational attainment and economic success. Bowles and Gintis argue that while schools do enhance and certify cognitive skills, they serve primarily to develop the noncognitive characteristics in workers that are required to maintain the social relations of capitalist production. According to their theory, the explicit organization of experience in varying curriculum tracks, in schools of differing socioeconomic composition, and at varying grade levels contributes to produce a labor force differentiated along personality or attitudinal lines roughly paralleling socioeconomic background, educational credentials, authority requirements on the job, and economic rewards. Bowles and Gintis account for the relationship between schooling and work with the "correspondence principle."

The correspondence principle, as formulated by Bowles and Gintis, posits "a close correspondence between the social relationships which govern personal interaction in the work place and the social relationships of the educational system. Specifically, the relationships of authority and control between administrators and teachers, teachers and students, students and students, and students and their work replicate the hierarchical division

of labor which dominates the work place" (1976:131). The correspondence principle implies that "the same type of behavior can be shown to be rewarded in both education and work" (1976:134). The principle also suggests that schools differentially socialize and reward students with varying backgrounds, consistent with the requirements of varying future occupational roles (1976:132).[1]

Finally, the correspondence theory suggests that the association between educational attainment and economic success can be explained by the relationships between noncognitive traits on the one hand, and education and success on the other. We would expect, then, to find the relationship between years of schooling and income or occupational status appreciably reduced when measures of relevant noncognitive traits are held constant.

In this paper we argue that important pieces of empirical evidence upon which Bowles and Gintis rely provide weaker support for the correspondence principle than their use of the evidence suggests. We also offer evidence that suggests only a loose overlap between noncognitive characteristics valued and rewarded by schools and those associated with holding a higher-status occupation or earning a higher income. Our evidence does, however, suggest that the characteristics schools reward in middle-class pupils may differ somewhat from those they reward in working-class pupils, in ways that are consistent with Bowles and Gintis's theory. Finally, our evidence does not support the expectation that controls for noncognitive traits significantly reduce the association between educational attainment and economic success. At the conclusion of the paper, we suggest empirical and interpretive extensions and revisions of Bowles and Gintis's approach.

BOWLES AND GINTIS'S USE OF SECONDARY DATA

Schooling in Capitalist America relies heavily on analyses and re-analyses of empirical data drawn from schools and from the workplace. Below, we briefly indicate our reservations concerning Bowles and Gintis's use of some of these data, and reservations concerning the completeness of Bowles and Gintis's data base.

1. To assess the role of personality characteristics in determining success in school, Bowles and Gintis rely, in part, on the work of Gene Smith (see Smith, 1967, 1969, 1970), who studied the relationships among peer ratings of student personality attributes and grades in three samples of college, nursing, and Spanish-speaking high school students. Among the factors Smith identified was "Strength of Character," which Bowles and Gintis rename "Work Orientation." "Strength of Character" is a composite factor, dominated by a measure of an individual propensity not to quit a task, on which Smith (1967) regresses measures of post-high-school academic performance of 348 students in the College of Basic Studies at Boston University.[2] But from Bowles and Gintis's theory, we would expect to find college marks more strongly related to measures of independence and self-direction than to a measure of mere stick-to-itiveness (see 1976:132). The importance of a measure defined largely by perseverance may be revealing of the actual nature of study in post-secondary institutions, but it provides little support for a theory that stresses the importance of differential behavior at varying levels within the educational and occupational hierarchies.

2. Bowles and Gintis also rely on work by John Holland to establish the importance of personality characteristics for school success (see Holland, 1961). Holland's sample consists of 639 National Merit Scholarship Qualifying Test finalists. National Merit finalists are usually drawn from at or near the top

of the distributions of academic achievement and intellectual ability. Because measures of ability or achievement and personality are only loosely related, this kind of selectivity necessarily reduces variability in test scores more than it reduces variability in personality measures. Moreover, in such a truncated sample, because the range of random error variation remains constant while the range of true variation is reduced, the proportion of random variability in test scores is necessarily raised. Consequently, the observed association of grades with personality measures could be higher than with test scores even if the opposite were true over the entire distribution of achievement. Thus Bowles and Gintis's findings, that personality variables outweigh achievement differences as predictors of grades in the Holland sample, may simply be an artifact of the sample's special characteristics. Bowles and Gintis do not use the evidence from the sample to discount the role of cognitive differences in determining grades (see 1976:41, 136, 140), but their presentation of empirical results exaggerates the relative importance of noncognitive characteristics.[3]

3. Bowles and Gintis often draw on Gintis's earlier work (see Gintis, 1969, 1971). In his 1971 article, "Education, Technology, and the Characteristics of Worker Productivity," when emphasizing the importance of personality traits for predicting grades, Gintis referred to the work of Gough and Hall (1964), which analyzes the correlates of success in medical school. But he makes no reference to the adjacent article by Harry F. Roadman, reporting on the factors affecting promotions among middle-level managers in a large corporation. Roadman finds that peer-ratings of emotional maturity, cooperativeness, and tact have insignificant effects, while critical thinking, judgement, originality, independence of thought, aggressiveness, self-expression, breadth of knowledge, overall impression, and capacity for advancement have significant positive effects. These are characteristics quite different from those which Bowles and Gintis

associate with "Internalized Control," the factor they advance as a prime determinant of success at higher positions in the work hierarchy (1976:135-136). (Internalized control, as defined by Bowles and Gintis, includes the internalization of work norms, empathizing orders, and deferring gratification.) These are also characteristics which are distinctly opposite those Bowles and Gintis argue are rewarded with higher secondary school grades, the most important of which is submission to authority (1976:136-138).

In sum, we find that Bowles and Gintis interpret evidence as confirming their theory even when the implications of the evidence are ambiguous. They also rely on unrepresentative samples in which predictable statistical artifacts could account for apparently substantive findings, and they neglect evidence not wholly compatible with their argument. In light of these problems, the extent to which previous research supports Bowles and Gintis' propositions must remain a matter of doubt.

AN EMPIRICAL TEST OF BOWLES AND GINTIS'S CORRESPONDENCE THEORY

To test some of the empirical contentions Bowles and Gintis advance and to test for empirical results implied in their theory, we have analyzed data from Olneck's Kalamazoo Brothers sample (see Olneck, 1976, 1977a,b). These data include 1) ratings on personality or behavioral characteristics provided by tenth-grade homeroom teachers, 2) measures of cognitive performance tested in the sixth-grade, 3) tenth-grade final English marks, 4) measures of family background, and 5) measures of educational attainment, initial and current occupational status, and 1973 earnings. Respondents for whom these data are available were 35 to 59 years old when the sample was surveyed in 1973-1974.[4]

Beginning in the late 1920s, Kalamazoo, Michigan, Central High School homeroom or attendance teachers rated students on nine characteristics labelled Cooperativeness, Dependability, Industriousness, Perseverance, Initiative, Integrity, Executive Ability, Emotional Control, and Appearance. Teachers marked each student as Above Average, Average, or Below Average. Olneck recorded a student's final overall rating for the sophomore year. Since nonlinearities in the effects of the ratings rarely persist in multivariace equations, we retained a simple three point-coding for the ratings.

Because some of the personality ratings are highly collinear (see Table 2, below), we decided to select one variable to represent each of three clusters of characteristics we intuitively identified. To represent "hard work" and "effort" we selected the rating on Industriousness. To represent "going along" or "responsiveness to authority," we selected Cooperativeness. To represent "leadership" and possibly "aggressiveness" or "self-direction," we selected Executive Ability. We also retained the rating on Appearance.[5] Our choice of variables means that we can place some confidence in the kinds of personality characteristics associated with particular outcomes. We will not, however, be able to identify fine distinctions within classes of personality characteristics. We make no pretense to having accurately tapped the full influence of personality differences on success. To do so would require exhaustive and thoroughly reliable longitudinal measures of relevant traits. Our goal is the more modest one of testing whether our measures behave as the Bowles and Gintis theory of correspondence leads us to expect.

Our measure of cognitive skill comes from either the Terman or Otis tests administered in sixth grade. From 1928 to 1942, the Kalamazoo school

system administered the Terman test, after 1942, the Otis test. Both emphasize verbal skills and are considered to be measures of "general brightness" or "general ability" (Buros, 1975). The Otis test is scaled to a lower mean than the Terman (Ratcliff, 1934), but its variance, correlations with other variables, and reliability are not reported to be different (Olneck, 1977a). Therefore, after taking into account the secular trend toward higher parental socioeconomic background and its measured effects on test scores, we adjusted the scores for respondents who had taken the Otis, and combined the two groups (see Olneck, 1977a for details). The mean score for the respondents in our present analyses is between 103 and 104, according to the dependent variable under consideration. The standard deviation is close to 15.0 in all our analyses.

Because English is a subject required of high school students, Olneck recorded sophomore final English marks. We coded these on a single-unit interval scale ranging from A = 4 to E or F = 0.[6]

To investigate and control for the impact of socioeconomic background, we included family size, and measures of the father's grade in school completed, occupational status as measured by the Duncan socioeconomic index (see Duncan, 1961) and status as a white-collar or blue-collar worker. The Kalamazoo sample is somewhat advantaged on such measures when compared with the 1973 national Occupational Changes in a Generation (OCG) replication survey (for these comparisons, see Olneck, 1977b; for analyses of the OCG-II survey, see Featherman and Hauser, 1978), but these differences are substantially reduced when differences between the surveys in racial composition and farm origin are taken into account. The Kalamazoo sample is virtually all white and of urban origin.

Traditional socioeconomic measures do not, however, capture all the influences that differentiate the children in one family from those in another. If they did, brothers would be no more alike than men raised in the same socioeconomic stratum, and the proportion of variance in a characteristic that is explained by socioeconomic background variables would equal the observed correlation between brothers (see Olneck, 1977b, and Corcoran and Jencks, 1979). For example, our present measures of background and a measure of mother's education together explain 31 percent of the variance in respondents' educational attainments in the Kalamazoo sample (Olneck, 1977a: I, 70). But the correlation between brothers' attainments is 0.55, which means that "family background," construed broadly to include all the influences producing similarity among brothers, explains 55 percent of the variance in education. If we control only for measured socioeconomic background when we estimate the effect of education we, therefore, inadvertently attribute to education effects actually produced by unmeasured background factors. (The same logic, of course, applies to any variable for which common socioeconomic background does not adequately explain sibling similarity.) To obviate this difficulty, we also report the effects of sibling differences on personality ratings, education and measured ability. This allows us to assess the consequences of those differences that exist within the same family.

We measured educational attainment as the highest grade in school completed. Our measures of socioeconomic success include Duncan scores for the first full-time job held after completion of all schooling and for 1973 or 1974 occupations, and the natural logarithm of self-reported 1973 earnings (ln earnings). We would like to have additional measures of success such as supervisors' ratings, promotion rates, degrees of on-the-job authority and autonomy, and perquisites. We would also like to have measures of

informal success, such as coworkers' esteem and informal leadership roles. Nevertheless, the status of a man's occupation and his earnings figure prominently in popular understandings of social position (see Coleman et. al., 1978:17-64, 211-224) and are also indicative of position within the work hierarchy, which is of central importance to Bowles and Gintis (see Wright and Perrone, 1977, and Robinson and Kelley, 1979).

Table 1 presents the means and standard deviations for the variables used in our analyses. Table 2 presents the correlations among these variables, including also the five personality ratings not used in the analyses. Our analyses of the determinants of educational and economic success follow.

DETERMINANTS OF ENGLISH MARKS

Table 3 presents the results of regressions of tenth-grade English marks on measures of personality, prior cognitive skill, and background. Three of the personality variables, Cooperativeness, Industriousness, and Appearance, are significantly related to grades, even when background and test scores are controlled. Equation 7 implies, however, that higher levels of Cooperativeness are expected to raise only the grades of boys with sixth-grade test scores above 90, and better standing in Appearance is expected to raise the grades only of boys from white-collar homes.[7]

We had expected that cooperative behavior would raise grades uniformly for all students, or would be rewarded more among students whose attachment to school is otherwise problematic, such as boys from blue-collar backgrounds (for convenience, "blue-collar" boys) or boys with low test scores. In the absence of direct information on teachers' marking practices, we can think of three possible reasons for the higher effect of Cooperativeness among boys whose ability at an earlier age had been gauged to be superior. First, mastery of

Table 1

Means and Standard Deviations (SD)

Variable	Acronym	Mean	SD	N
Appearance[a]	APPEAR	2.23	0.48	420
Industriousness[a]	INDUST	2.08	0.62	420
Cooperativeness[a]	COOP	2.24	0.62	420
Executive Ability[a]	EXEC	1.89	0.57	420
Test Score[b]	IQ	103.71	14.79	420
Year of Birth	YRBORN	1930	5.08	420
Father's Education[c]	POPED	9.90	3.43	420
Father's Occupation[d]	POPDUNC	40.72	22.79	420
Father White Collar[e]	POPWHCOL	0.38	0.49	420
Number of Siblings	SIBS	3.37	2.29	420
English Mark[f]	ENGMARK	2.01	1.04	420
Education[c]	ED	13.87	2.58	419
Initial Occupation[d]	YNGDUNC	42.12	24.48	428
Current Occupation[d]	DUNC	53.08	22.62	425
Ln 1973 Earnings	LNEARN	9.68	0.44	400

[a]Measured on a three-point scale, with 3 = Above Average, 2 = Average, 1 = Below Average.

[b]Sixth-grade Terman group test score, or adjusted Otis score (see text).

[c]Measured in years completed.

[d]Duncan Socioeconomic Index score.

[e]Dichotomous variable, coded 1 = white-collar and 0 = blue-collar.

[f]Tenth-grade cumulative year-end English mark, coded 4=A, 3=B, 2=C, 1=D, 0=F.

Table 2

Correlations (N = 371 individuals with complete data)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. APPEAR	1.000																			
2. INDUST	.420	1.000																		
3. COOP	.474	.666	1.000																	
4. EXEC	.351	.408	.410	1.000																
5. PERSV[a]	.464	.810	.707	.423	1.000															
6. DEPEND[b]	.454	.693	.822	.402	.694	1.000														
7. EMOT[c]	.494	.631	.647	.492	.639	.642	1.000													
8. INIT[d]	.494	.522	.484	.593	.516	.450	.514	1.000												
9. INTEG[e]	.472	.608	.706	.364	.613	.751	.646	.433	1.000											
10. IQ	.198	.200	.211	.241	.190	.254	.218	.275	.224	1.000										
11. YRBORN	.060	-.061	.033	-.129	-.033	-.003	.036	.002	.101	.140	1.000									
12. POPED	.217	.243	.250	.178	.199	.222	.241	.248	.230	.240	.162	1.000								
13. POPDUNC	.143	.196	.165	.069	.155	.162	.108	.138	.161	.192	.043	.429	1.000							
14. POPWHCOL	.134	.116	.107	.002	.085	.093	.035	.053	.082	.158	.091	.370	.741	1.000						
15. SIBS	-.168	-.013	-.073	-.048	-.038	-.063	-.033	-.038	-.018	-.146	.003	-.219	-.183	-.166	1.000					
16. ENGMRK	.339	.453	.416	.241	.417	.446	.356	.418	.425	.389	.215	.293	.205	.175	-.132	1.000				
17. ED	.253	.352	.331	.293	.343	.361	.319	.279	.309	.479	.187	.424	.287	.297	-.200	.522	1.000			
18. YNGDUNC	.214	.338	.287	.270	.302	.322	.241	.244	.211	.430	.140	.340	.337	.319	-.180	.413	.733	1.000		
19. DUNC	.230	.289	.198	.228	.267	.228	.200	.245	.192	.394	.051	.237	.217	.227	-.173	.395	.584	.568	1.000	
20. LNEARN	.175	.153	.136	.237	.112	.108	.124	.185	.105	.324	.064	.200	.151	.161	-.127	.280	.432	.422	.483	1.000

a. Perseverance b. Dependability c. Emotional Control d. Initiative e. Integrity

Table 3

Regressions of Tenth Grade English Mark on Measures of Personality, Ability, and Background (N=420. Metric Coefficients Shown Above. Standardized Coefficients in Brackets.)

Variable	Equations: 1	2	3	4	5	6	7	8[a]	9[b]	10[a]	11[b]	12[a]	13[b]
APPEAR	.328** [.151]			.243** [.113]	.216** [.097]	.175* [.080]	.030 [.013]			.294** [.135]	.275 [.126]	.267** [.123]	.282 [.129]
APPEAR*POPUNICOL							.373** [.419]						
COOP	.269** [.161]			.233** [.137]	.182** [.109]	.170* [.102]	-1.095** [-.655]			.117 [.070]	.096 [.058]	-1.325* [-.796]	-.426 [-.268]
EXEC	-.005 [-.003]			-.095 [-.052]	.061 [.033]	-.024 [-.013]							
INDUST	.488** [.293]			.475** [.285]	.529** [.317]	.584** [.309]	.662** [.397]			.597** [.361]	.361** [.218]	.582** [.352]	.358** [.214]
INDUST*POPUNICOL							-.364** [-.792]						
IQ		.028** [.404]		.022** [.309]		.018** [.257]	-.009 [-.122]	.031** [.429]	.010 [.142]	.020** [.275]	.008 [.112]	-.013 [-.176]	-.004 [-.057]
IQ*COOP							.012** [.936]					.014** [1.076]	.005 [.396]
YRBORN			.040** [.196]		.046** [.225]	.039** [.192]	.040* [.195]			.044** [.207]	.017 [.081]	.043* [.204]	.017 [.075]
POPED			.061** [.201]		.027** [.089]	.019 [.064]							
POPDUNC			.004 [.003]		.002 [.034]	.001 [.016]							
POPUNICOL			-.013 [-.006]		.048 [.022]	.026 [.012]							
SIBS			-.033 [-.073]		-.031 [-.069]	-.021 [-.047]							
COMMON BACKGRND[c]									NA		NA		NA
R^2	.250	.162	.121	.336	.319	.375	.393	.184	.491[d]	.434	.494[d]	.443	.483[d]

** Significant at the .05 level

* Significant at the .10 level

a. N = 226 individuals for whom relevant data are available for brothers. See text.

b. N = 113 pairs of brothers. Metric coefficients are standardized by individual level standard deviations to derive beta coefficients.

c. Controlled by defining variables as sibling differences. See text.

d. Equivalent to the R^2 one would observe regressing individual ENGMARK on independent variables plus dummy variables representing family membership.

the work given to bright students may require more cooperation: greater attentiveness, attendance, and keeping up. Second, the school may genuinely require a modicum of intellectual mastery; below that modicum, even the most slavish adherence to the disciplinary regime cannot compensate. But direct inspection shows that the effects of Cooperativeness continue to rise with test scores even above 90, so that this explanation must at best be incomplete (these results are not shown in Table 3). Finally, teachers may expect bright students to be well-behaved, and may react more severely to the uncooperative, but potentially good student than to a student of whom little is expected. However, Equation 9, based on estiamtes in which brothers are compared, shows that within the same family, the size of the effect of Cooperativeness does not depend upon cognitive level. Our estimates are based on only 113 pairs of brothers, but if the pattern they suggest is correct, our most parsimonious interpretation would be that the apparent dependence of the effect of Cooperativeness on level of test score is spurious--an artifact of unmeasured family differences affecting most strongly the school achievement of boys who both score well on tests and are rated highly by their teachers on Cooperativeness. If this is true our three earlier hypotheses become superfluous, and our best estimate of the effect of Cooperativeness would be that a shift from Below Average to Above Average would raise any boy's English grade by something over one-quarter of a point.

"Hard work," as reflected in the measure Industriousness, is the characteristic most highly rewarded along the entire range of students.[8] We would expect two otherwise similar brothers who were classified Above Average and Below Average on Industriousness to have English grades which differed by 0.7 (see Equation 11). Among blue-collar children, the effect of Industriousness is particularly pronounced (see Equation 7). With other characteristics

controlled, we would predict a blue-collar student rated Above Average on Industriousness to have an English mark 1.3 letter grades higher than a student marked Below Average; the comparable differential among white-collar students is only 0.6.

If we are to substantively interpret our results, we must assume, though we cannot be certain, that Industriousness measures the same characteristics for white-collar and blue-collar students and that teachers are as aware of variations in hard work among white-collar pupils as they are among blue-collar pupils. We might expect the result that we have found if hard work for white-collar students means extra effort beyond an already high expected minimum, while for blue-collar students it means diligence in meeting a modest requirement which some do not even attempt to achieve.

It is possible that blue-collar pupils were in classes in which effort counted more for performance on the tasks that were evaluated. For example, if blue-collar children were more often asked to recall facts from their readings, while white-collar children were more often asked to interpret meaning, or if blue-collar children were more often given spelling tests while white-collar children were given creative writing assignments, diligence per se could be expected to have greater payoff for blue-collar than for white-collar students.[9] Such a difference in the nature of tasks for children of varying origins would fit well with Bowles and Gintis's depiction of the differences in tasks and requisite aptitudes that are characteristic of the work hierarchy. Without direct information on classroom assignment and pedagogical practices we cannot, of course, test this speculation directly.

There is another plausible explanation: teachers may hold significantly lower expectations of the ability of blue-collar children to achieve mastery

of scholastic material, so to maintain incentives and goodwill, they reward blue-collar students simply for effort, while refusing to reward white-collar children for anything except performing to expectations. Thus Industriousness, among white-collar students, would measure the extent to which greater application actually contributes to more learning, while the blue-collar "bonus" measures the effect of effort per se. If this interpretation is correct, we might suggest that blue-collar children are more likely than white-collar children to appreciate the rewards of appearing diligent, sticking closely to the routine of assignments, and, at the same time, not being overconcerned at failing to achieve a high level of academic achievement. This outcome, too, is consistent with the distinctions Bowles and Gintis draw among the model characteristics demanded along the work hierarchy, and with their suggestions about socialization practices within schools.

Differences in Appearance are associated with differences in grades only among white-collar pupils (see Equation 7). We would have predicted the opposite, expecting differences in neatness among blue-collar children to signify "seriousness," "respect," or "parental concern" to teachers who, we might presume, were skeptical of the commitment of their blue-collar charges. It is difficult to believe that teachers assign grades on the basis of appearance per se, and we first suspected that the measure Appearance proxies parental occupational or income differences associated with differences in the social, linguistic, and cognitive competence rewarded in school. However, Equations 10 and 11 show that if we hold constant family background and compare brothers, the effect of Appearance does not appreciably alter; thus it does not seem to derive solely from differences among families. Ethnographic research would be required to identify what the ranking on Appearance actually measures and how it comes to be related to grades.

Executive Ability has no effect on grades. This suggests that this measure does not tap otherwise unmeasured cognitive skills, nor the ambition or motivation to excel scholastically.

Because we assumed that performance on schoolwork and standardized tests both depend in large measure on common cognitive aptitudes, we expected that students who scored well on the sixth-grade tests would also earn higher grades. Even Bowles and Gintis do not dispute a large cognitive component in grades (see 1976:136, 138, 140). Our results suggest, however, that the often-cited significant association between standardized test scores and scholastic achievement (e.g., Jencks et.al., 1972:111) is largely spurious. When brothers who are rated similarly on the personality rankings are compared we find that the expected effect of test score differences on grades is only one-quarter of the uncontrolled effect and is statistically insignificant (compare Equations 11 and 12). Comparing brothers as we have done best controls variations in those skills, information, and aptitudes on which brothers most resemble each other. The available data on fraternal twins suggest that siblings tend to resemble each other more on tests stressing vocabulary knowledge and language facility (Loehlin and Nichols, 1976:33,39). Both the Otis and Terman tests are heavily verbal, but the items on which brothers most resembled each other may well have been those requiring simply a large vocabulary. If so, our results would suggest that it is intellectual "possessions" rather than "IQ" or "intelligence" that most affect academic success, at least in English classes.[10]

Boys whose fathers were well educated received higher marks (see Equation 5), but when the father's education was controlled, boys whose fathers held higher-status occupations and white-collar jobs did not achieve higher grades. A large fraction of the advantage held by boys with better-educated fathers

is explained by their favorable personality traits; when test score differences are also taken into account, that advantage is reduced to substantive and statistical insignificance. The absence of strong socioeconomic effects on grades in our sample is not surprising because boys from lower socioeconomic backgrounds who attained the tenth grade were less typical of their cohorts than were boys of higher socioeconomic status. Still, we might have expected to find background related to some differences in achievement levels. Sewell and Hauser (1975:99) report small but significant effects of some background measures in their sample of 1957 Wisconsin high school seniors, and Bourdieu and de Saint-Martin (1974) note that even when lower class pupils survive into French secondary schools they are disadvantaged by the vague and diffuse standards employed in the evaluation of competitive oral and written exams. No phenomenon of "cultural bias" comparable to that in French lycées appears to have governed regular coursework in Kalamazoo.

To this point, our results tend more to support than to refute the empirical claims and implications of Bowles and Gintis's correspondence theory. Bowles and Gintis find that Perseverance is the strongest personality factor predicting secondary school grades. Among the rankings we employed, Industriousness has the largest impact. The stronger effect of Industriousness among blue-collar boys which we found is consistent with claims Bowles and Gintis advance concerning class-related differences in socialization in school and in occupational destinations. The small positive effect of Cooperativeness in our data is in the same direction, but is weaker than the result Bowles and Gintis report for a measure of dependability. We question Bowles and Gintis's claim that there is a large, purely cognitive (i.e., IQ) component to grades, but suspect that they would be pleased to concede this

finding, which weakens further the postulates underlying a "technocratic-meritocratic" model of achievement and award. Bowles and Gintis do not advance any specific claims concerning the likely effects of socioeconomic background on high school grades. The absence of direct class bias in grading is consistent both with their arguments that some of the empirical relationships advanced by the "meritocratic" model must be believable if the model is to successfully legitimate inequalities, and with the arguments of others who characterize the schools as fair, competitive arenas committed to universalistic values.

DETERMINANTS OF EDUCATIONAL ATTAINMENT

Table 4 presents the results of the regressions of educational attainment on measures of personality, ability, grades, and family background. Equation 7 shows the results of our best estimates of the effects of these characteristics. While social background has no appreciable effect on success within school as measured by grades, it does have an effect on persistence in school. Men whose fathers had more schooling, especially men whose fathers were college graduates, men whose fathers held white-collar jobs, and men from smaller families acquired more schooling. This is true even for men of similar ability, rated by their teachers as similar in their personality characteristics, and achieving comparable academic success. Indeed, only 36 percent of the educational advantage held by men whose fathers had college degrees over men whose fathers had only high school diplomas, and 6 percent of the advantage held by white-collar men in general, can be explained by measures of superior ability and achievement and by those personality traits formally evaluated by teachers. Rather, varying financial constraints,

Table 4

Regressions of Educational Attainment on Measures of Personality, Ability, Grades, and Background (N=419. Metric Coefficients Shown Above. Standardized Coefficients in Brackets.)

Variable	Equation: 1	2	3	4	5	6	7	8[c]	9[d]	10[c]	11[d]
APPEAR	.901** [.167]			.477* [.071]	.477* [.079]	.187 [.035]					
CDOP	.411 [.099]			.102 [.024]	.151 [.036]	.001 [.000]					
EXEC	.591** [.129]			.379* [.083]	.690** [.151]	.452** [.099]	.465** [.102]	.194 [.043]	-.102 [-.023]	.173 [.038]	-.114 [-.026]
INDUST	.717** [.173]			.289 [.070]	.741** [.179]	.370* [.089]	.364** [.088]	.454* [.112]	.477 [.118]	.423* [.104]	.473 [.117]
IQ		.085** [.487]		.052** [.300]		.044** [.250]	.019 [.107]	.042** [.238]	.041** [.233]	.019 [.110]	.036 [.205]
ENCHARX				.816** [.326]		.641** [.257]	-.574 [-.230]	.648** [.274]	.778** [.312]	-.468 [-.188]	.503 [.202]
IQ*ENCHARX							.012** [.576]			.011 [.545]	.003 [.151]
YRBORN			.066** [.129]		.084** [.166]	.040** [.078]	.041** [.080]	.061** [.113]	.089* [.165]	.062 [.115]	.089* [.165]
POPED			.157** [.208]		.104** [.138]	.075** [.100]	.070* [.093]	.112** [.159]		.106** [.151]	
POPBA[a]			1.627** [.177]		1.366** [.148]	1.206** [.131]	1.157** [.126]	.601 [.075]		.365 [.071]	
POPDUNC			.003 [.030]		-.001 [-.009]	-.004 [-.033]					
POPWHCOL			.640** [.120]		.788** [.147]	.711** [.136]	.601** [.113]	.676** [.127]		.686** [.129]	
SIBS			-.117** [-.104]		-.111** [-.098]	-.068 [-.060]	-.072* [-.064]	-.140** [-.113]		-.132** [-.106]	
COMMON BACKGRND[b]									NA		NA
R^2	.182	.236	.242	.397	.346	.472	.479	.541	.627[e]	.543	.623[e]

**Significant at the .05 level.

*Significant at the .10 level.

a. Dummy variable coded 1 if father's education equal to or greater than 16. Else coded zero. Measures the additional amount of education for a son than would be predicted solely on the basis of the linear effects of father's education.

b. Controlled by defining variables as sibling differences. See text.

c. N = 206 individuals for whom relevent data are available for brothers. See text.

d. N = 103 pairs of brothers. Metric coefficients are standardized by individual level standard deviations to derive beta coefficients.

e. Equivalent to the R^2 one would observe regressing individual education on independent variables plus dummy variables representing family membership.

preferences, and values among similarly successful high school students appear to account for most of the significant impact of background on educational attainment.[11]

With background characteristics, test scores, and grades controlled, Executive Ability and Industriousness have significant effects on attainment. However, the effect of Executive Ability is substantially lower and is statistically insignificant among the individuals composing our brothers subsample (see Equation 8). There are no striking differences in the univariate statistics or correlations for the subsample which would readily explain this difference, so perhaps the significant effect in the combined sample should be attributed to sampling error. The effect of Industriousness is substantially the same in the brothers subsample as it is in the larger sample, and the effect persists when brothers are compared, although, with the one-half loss of sample size in analyzing pairs, it lacks statistical significance (compare Equations 7,8,9). Industriousness may have been a characteristic valued by admissions officers in the post-secondary institutions to which our respondents applied, or it might have been a correlate of motivations and aspirations not otherwise measured in our data.

The effect of Cooperativeness was insignificant--a fact that emphasizes the distinction between success within school and continued attendance. Teachers awarded uncooperative students somewhat lower grades, but men could persist in their schooling despite the judgements rendered about their cooperation.

Men with higher sophomore grades acquired more schooling. This is no surprise, since grades should be some indication of taste for schooling and since colleges often have entrance requirements. What is surprising is the interaction we found between test scores and grades. Among men who performed well on the ability tests, those with higher grades were much more likely to go

on in school. Among those who performed poorly on the tests, higher grades did not lead to the same increase in educational attainment. Yet we would have expected differential academic success to be of little consequence to brighter students and to spark the aspirations of otherwise struggling students most. Since our result cannot be explained by any general pattern of smaller effects from differences between relatively low grades (e.g., between a C and a D rather than between an A and a B), the most plausible explanation, which we cannot verify directly, is that students with low test scores were usually not in collegebound curricular tracks; they did not view nor did their teachers treat higher grades as a means to further education. For men with high test scores in college preparatory tracks, differences in performance could affect otherwise uncertain aspirations, plans, and opportunities for further schooling. This interpretation is strengthened by our finding that, except for the few individuals with scores over 130, the variance in educational attainment rises monotonically with test scores (see Olneck, 1977a: I, 60). This pattern of results is also consistent with Rosenbaum's (1976) "tournament" model of educational attainment, in which placement in a college curriculum track is not necessarily permanent, and in which college attendance requires but is not guaranteed solely by completion of the college preparatory program.

Within families, however, the effect of grade differences does not depend upon test score level (compare Equation 9 and 10). If our explanation is correct, it evidently holds only when comparing individuals from different families. This may be because brothers are usually in the same curriculum track regardless of test score differences, or because families in some sense "detrack," so that an individual who receives higher grades than his brother benefits from a sense of accomplishment or evokes parental encouragement that

is blind to the differences between tracks.

Men with higher test scores got more schooling, but the differences are greater for men with better grades. To achieve any particular grade, we would expect men with lower test scores to have worked harder or in other ways applied themselves more effectively to their academic tasks than men with higher scores, for whom schoolwork presumably comes more easily. This would produce an inverse correlation between unmeasured motivational traits and test scores among men who receive the same grades. If such an inverse correlation were more pronounced among men with low grades, i.e., if high-scoring men with low grades are further below their mean for unmeasured motivational traits than low-scoring men with high grades are above theirs, we would expect test score differences among men with high grades to have larger effects on educational attainment than among men with low grades because there would be a smaller countervailing effect from unmeasured motivational traits. This would result in the pattern we found.[12] Within families, the level of English mark (the only grade we used) does not influence the effect of ability differences on attainment (Equation 8), suggesting that for brothers with the same grades, the expected inverse relationship between motivation and test scores is reduced.[13]

Omitting the test score--English grade interaction, the average effect of ability differences on educational attainment is the same among brothers as it is among men who are merely from similar socioeconomic backgrounds (compare Equation 11 with 10). Contrary findings reported elsewhere (Olneck, 1977b) evidently reflect the consequences of brothers' similarity on grades and personality characteristics. Once these are explicitly introduced, the (reduced) effect of test scores is robust. The effect of grade differences among brothers is higher than among unrelated men, but not appreciably so. These two results suggest that families neither compensate for siblings'

inequalities in ability or performance nor amplify their effects.

Bowles and Gintis offer no systematic account of why socioeconomically advantaged men acquire more schooling. They argue that IQ differences do not explain the relationship between background and attainment (1976:30-33), and with this we agree. Indeed, we argued that differences in ability, academic performance, and adherence to school norms, taken together, do not explain why men with better-educated fathers and white-collar fathers get more schooling. Bowles and Gintis argue, further, that IQ differences do not explain the relationship between social background and adult economic success (1976:119-122). They also downplay the mediating role of education, stressing instead the direct economic effects of social background among men with both the same test scores and the same amount of schooling (1976:141-147). Their data show, however, that if we hold constant years of schooling alone, we reduce the association between background and occupational status by 56 percent, and between background and income by 46 percent.[14] Thus, education is an important mechanism in the inheritance of status, and we would like to be able to specify the reasons that higher status offspring remain in school longer. Among other potentially relevant factors, the self-conscious pursuit of particular higher-status occupations does not appear to explain a large fraction of the link between background and educational attainment.[15] It is more as if high-status youngsters pursue schooling for reasons not explicitly related to well-articulated future plans; only later do they adjust their specific occupational choices to reflect their educational qualifications.

In summary, our analyses identified important differences between the determinants of grades and the determinants of educational attainment. The differences suggest revisions in Bowles and Gintis's correspondence theory; they imply that when employers select men on the basis of more schooling, they

are not necessarily selecting them for the same reasons individuals do well in school. Socioeconomic background does not directly affect grades, but it does affect attainment, suggesting that teachers are indifferent to the background-related variations in values, culture, and behavior that nevertheless affect the choices individuals make about remaining in school, and that may influence employers' preferences as well. Teachers reward high levels of cooperative behavior, but the kind of cooperation valued in classrooms is unrelated to continuing in school. Finally, the apparent effects of measured cognitive ability on grades are reduced to substantive and statistical insignificance within families, but the direct effects of ability differences on educational attainment persist within families.

DETERMINANTS OF INTIAL OCCUPATIONAL STATUS

Table 5 presents the results of the regressions predicting initial occupational status. Men with favored socioeconomic backgrounds entered higher-status occupations, but this is not largely because of characteristics proxied by the personality ratings given them by their teachers. Controlling the personality ratings raises the effects of some background variables, lowers the effects of others, and leaves the effects of family size unchanged, leaving the combined effects similar (compare Equations 3 and 5).[16] Rather, higher socioeconomic status raises initial occupational status principally because it raises educational attainment (see Equation 6). Similarly, the advantage of men with higher personality ratings is also due to superior educational attainment (compare Equations 1 and 4).

Equation 7 gives our best estimate of the determinants of initial occupational status. Appearance and English Mark are not included in this equation nor in the others, because Appearance is not significant at any

Table 5

Regressions of Initial Occupational Status on Measures of Personality, Ability, Education, and Background
(N = 428. Metric Coefficients Shown Above, Standardized Coefficients in Brackets.)

Variable	Equation: 1	2	3	4	5	6	7	8[b]	9[c]
COOP	2.360 [.073]			-1.292 [-.033]	.095 [.002]	-1.527 [-.039]	1.698 [.044]	-.868 [-.022]	-.325 [-.008]
COOP*POPUNCOL							-7.454** [-.360]		
EXEC	5.652** [.132]			.749 [.017]	6.519** [.152]	.976 [.023]			
INDUST	8.982** [.229]			3.398** [.092]	8.317** [.217]	3.632** [.093]	3.384* [.086]	3.435 [.088]	5.617 [.144]
IQ						.123** [.075]	.055 [.033]	.110 [.068]	.111 [.063]
IQ*POPUNCOL							.189** [.405]		
ED		6.813** [.724]		6.535** [.697]		5.835** [.620]	5.824** [.619]	5.707** [.608]	5.496** [.585]
YRBORN			.431** [.090]		.636** [.133]	.084 [.018]			
POPED			1.365** [.191]		.849** [.119]	-.187 [-.026]			
POPDUNC			.140* [.130]		.092 [.085]	.093* [.086]	.099* [.092]	.126 [.115]	
POPUNCOL			7.380** [.146]		9.170** [.182]	3.750 [.074]			
SIBS			-.880* [-.084]		-.893** [-.085]	-.032 [-.003]			
COMMON BACKGRND[a]									NA
R^2	.126	.523	.173	.526	.261	.544	.555	.517	.605[d]

**Significant at the .05 level.

*Significant at the .10 level.

a. Controlled by defining variables as sibling differences. See text.

b. N = 234 individuals for whom relevant data are available for brothers. See text.

c. N = 117 pairs of brothers. Metric coefficients are standardized by individual level standard deviations to derive beta coefficients.

d. Equivalent to the R^2 one would observe regressing individual initial occupational status on independent variables plus dummy variables representing family membership.

stage in the analysis, and because grades are related to initial occupational status only insofar as they are related to educational attainment. This is true also in our analyses of current occupational status and earnings (see below). Our measure of Appearance evidently does not proxy relevant differences in "self-presentation" with which employers may be concerned (see Bowles and Gintis, 1976:140-141), nor do grades proxy economically relevant characteristics which might lead to different levels of success among men with the same amount of schooling.[17] Becuase there are wide variations in the grades of men with equivalent levels of educational attainment, and because employers appear indifferent to these variations or to their unmeasured correlates, we conclude that the formal reward structure of schooling does not respond to the same characteristics as does the reward structure in the adult male labor market, insofar as this is reflected in the status of occupations and in earnings.

We found that among men of white-collar origin the rating on Cooperativeness bears a significant negative relationship to initial occupational status--a finding that introduces ambiguity into our assessment of the correspondence theory. It is difficult to believe that employers want uncooperative employees who disrupt work or argue with their coworkers. We doubt that "troublemakers" make desirable employees. Although it is possible that the high school troublemaker becomes the model potential employee by the time he finishes his education, we think another explanation for our finding is more likely. If teachers want students who wait for as well as follow directions, if they want students to complete work in predetermined sequences by predetermined methods and to refrain from introducing idiosyncratic variations, and if they want students to pay attention even if they have already mastered the material, then they may well label as cooperative the student who is most responsive to explicit rules and directions.

In contrast, employers selecting men for the higher-status occupations which white-collar sons are more likely to enter may place a higher value on individual self-direction. This would be consistent with Bowles and Gintis's contention that self-direction is important at the upper reaches of the work hierarchy, but it is inconsistent with their contention that the same behaviors are rewarded at work as in school. The matter is complicated by Bowles and Gintis's implication that post-secondary educational institutions do reward self-direction (1976:132), so that our finding might be considered indicative only of the mismatch between secondary school training and the demands of higher-status occupations. This would leave us, however, in the awkward position of claiming support for Bowles and Gintis from both positive and negative effects of the same measure.

The modest effect of Industriousness may reflect more diligent and ambitious job searching among those rated highly, or it may reflect the consequences of better recommendations and the employer's response to information contained in school records.

When we turn from personality ratings to academic achievement, we find much clearer lines of influence, above all for educational attainment. Among men of white-collar origin, test score differences, even among those with the same amount of schooling and similar personality ratings, are significantly related to initial occupational status. This is not only because the sons of white-collar workers are more likely to enter the professions, for the effect persists when a variable measuring entrance into the professions is controlled. We have no ready explanation for its presence (other than sampling errors).[18]

The effect of educational attainment on initial occupational status is large and robust. An extra year of schooling, on average, is associated with

an increment of almost 7 points in the Duncan score for a man's first full-time job upon completion of schooling.[19] If we were to compare brothers with the same test scores and personality ratings, we would expect the effect of education to be 5.71/6.68 = 85 percent as large as the uncontrolled effect. If we were to compare men with only the same personality ratings, we would expect the effect of education to be 6.56/6.82 = 96 percent of the uncontrolled effect.

Our results suggest that if employers are aware of the variations in teachers' judgements of students' personalities--or are directly aware of the differences those judgements reflect--they are evidently indifferent to them, and we must conclude that the reasons for which better-schooled men get higher-status first jobs are unrelated to the noncognitive characteristics for which we have measures. Bowles and Gintis (1976:109-114) believe the contrary: they reject the argument that variations in cognitive skill explain the link between schooling and economic success and suggest that variations in personality characteristics are a more important source of the relationship (1976:140). We will consider their argument as it pertains to earnings below; for now, we would conclude that our evidence does not suggest measured personality characteristics are an important source of the schooling-occupation link. This is important if we view occupations as membership groups selected, in part, on cultural and value affinities (see Collins, 1979). Our results suggest that such affinities are proxied or produced directly by education, and that years of schooling constitutes a variable that in itself contains important information not contained in measures of behavior within educational institutions.

DETERMINANTS OF CURRENT OCCUPATIONAL STATUS

Table 6 presents the results of our analyses of the determinants of current occupational status. Only one of the socioeconomic background measures, father's education, has a significant effect, and this is explained entirely by the lengthier schooling of men with better-educated fathers (result not shown).[20] Men rated highly on Executive Ability hold higher-status jobs, but this, too, is explained by the mediating effects of education (compare Equations 1 and 4). Men rated highly on Industriousness also hold higher status jobs. This is, in part, because they have more schooling (compare Equations 1 and 4), and, in part, because they held better first jobs (compare Equations 1 and 6). Once initial occupational status is added to background, test scores, and educational attainment, none of the personality ratings is significantly related to current occupational status. Men with more schooling hold better jobs, but this cannot be explained by their superiority on our personality measures (compare Equations 2 and 4).

In that the effects of test scores and Industriousness are greater and those of education smaller, the results from the subsample of brothers are in some respects discrepant with those in the larger sample (compare Equations 6 and 8). There are no pronounced differences between the sets of univariate or bivariate statistics for the subsample and the larger sample, so we suspect the differences are due to sampling error. Therefore, we do not advance the results in Equations 8 and 9 as representative point estimates, but only as indicative of biases associated with unmeasured aspects of family background. Comparing brothers with one another suggests that the occupational effects of initial occupational status, test scores, and educational attainment are relatively insensitive to controls for background. The positive effect of Industriousness is increased by two-thirds, and the

Table 6

Regressions of Current Occupational Status on Measures of Personality, Ability, Education, Background, and Initial Occupational Status (N = 425. Metric Coefficients Shown Above. Standardized Coefficients in Brackets.)

Variable	Equation: 1	2	3	4	5	6	7	8[c]	9[d]
COOP	.135 [.004]			-2.325 [-.078]	-2.708 [-.075]	-2.378 [-.066]		-1.210 [-.034]	-6.600 [-.186]
EXEC	5.080** [.128]			1.320 [.033]	.383 [.010]	.248 [.006]		-2.175 [-.055]	-.834 [-.021]
INDUST	8.203** [.227]			3.997** [.111]	4.334** [.121]	3.170 [.088]		4.442* [.129]	7.214* [.209]
IQ					.209** [.138]	.178** [.117]	.177** [.117]	.285** [.194]	.295* [.201]
ED		5.189** [.396]		4.979** [.572]	4.356** [.500]	2.848** [.327]	2.817** [.324]	1.911** [.226]	2.173* [.257]
POPED			.943* [.143]		-.247 [-.045]	-.233 [-.035]			
POPDUNC			.066 [.067]		.021 [.021]	-.003 [-.003]			
POPWNCOL			5.342 [.115]		2.330 [.054]	1.738 [.037]			
SIBS			-1.0187 [-.113]		-.372 [-.038]	-.379 [-.039]			
AGE[a]			-.092 [-.021]		.184 [.042]	.212 [.048]			
YNGDUNC						.260** [.231]	.274** [.296]	.279** [.310]	.251** [.279]
COMMON BACKGRND[b]									NA
R^2	.088	.354	.087	.357	.371	.406	.408	.413	.415[e]

**Significant at the .05 level.

*Significant at the .10 level.

a. 1973-YRBORN

b. Controlled by defining variables or sibling differences. See text.

c. N = 224 individuals for whom relevant data are available for brothers. See text.

d. N = 107 pairs of brothers. Metric coefficients are standardized by individual level standard deviations to derive beta coefficients.

e. Equivalent to the R^2 one would observe regressing individual current occupational status on independent variables plus dummy variables representing family membership.

negative effect of Cooperativeness is increased over fourfold, though the effect still does not attain statistical significance. These results suggest that men who work unusually hard at school are later more likely to be promoted or to seek out upward job changes, but that men who were judged highly cooperative are more likely to be passed over in promotions and to be surpassed by others in upward job changes. We would, however, stress the tentative nature of these particular findings.

DETERMINANTS OF EARNINGS

Table 7 presents the results of our analyses of the determinants of the natural logarithm of 1973 earnings (ln earnings). Of the socioeconomic background measures, only father's education has a significant effect (see Equation 3), and this disappears when educational attainment is held constant (result not shown).

Executive Ability is the only personality measure which significantly affects earnings. Men ranked Above Average on Executive Ability would be expected to earn $[e^{2(0.1446)} - 1] = 33.5$ percent more than men ranked Below Average (see Equation 1). Men with the same test scores, amounts of schooling, and occupational statuses would be expected to differ by $[e^{2(0.0711)} - 1] = 15.3$ percent in earnings if they differed by two rankings on Executive Ability (see Equation 7). Comparing Equations 11 and 12 suggests that we would expect this effect to fall by about one-fifth when unmeasured aspects of family background are also taken into account.

Because Executive Ability is unrelated to grades, we concluded earlier that it did not measure ambition or motivation, at least as these were directed toward academic goals. Mueser (1979:157) suggests that the characteristics measured by the teacher's rating of Executive Ability in the Kalamazoo data

Table 7

Regressions of Natural Logarithm of 1973 Earnings on Measures of Personality, Ability, Education, Background and Current Occupational Status (N = 400. Metric Coefficients Shown Above. Standardized Coefficients in Brackets.)

Variable	Equation: 1	2	3	4	5	6	7	8	9[c]	10[d]	11[c]	12[d]
COOP	.0268 [.035]			-.0218 [-.031]		-.0211 [-.030]						
EXEC	.1446** [.190]			.0937** [.124]		.0810** [.107]	.0711** [.094]	.0618* [.081]	.0512 [.072]	.0407 [.057]	.0503 [.070]	.0390 [.055]
INDUST	.0518 [.074]			-.0070 [-.010]		-.0110 [-.016]						
IQ					.0045** [.152]	.0042** [.141]	.0041** [.140]	.0026** [.088]	.0046** [.163]	.0105** [.369]	.0028 [.097]	.0086* [.302]
ED		.0757** [.446]		.0716** [.422]	.0627** [.369]	.0592** [.348]	.0588** [.346]	.0308** [.181]	.0501** [.312]	.0544** [.339]	.0241* [.150]	.0333 [.208]
POPED			.0160** [.124]			-.0013 [-.010]						
POPDUNC			.0006 [.030]			.0000 [.000]						
POPWHCOL			.0944 [.104]			.0584 [.064]						
SIBS			-.0128 [-.069]			-.0014 [-.008]						
AGE[a]			.0009 [.010]			.0038 [.043]		.0064** [.328]			.0063 [.327]	.0056** [.292]
DUNC												
COMMON BACKGRND[b]										NA		NA
$\bar{R}^2$	.057	.197	.044	.203	.212	.211	.218	.284	.191	.257[e]	.253	.299[e]

**Significant at the .05 level.

*Significant at the .10 level.

a. 1973-YRBORN

b. Controlled by defining variables as sibling differences.

c. N = 208 individuals for whom relevant data are available for brothers.

d. N = 104 pairs of brothers, Metric coefficients are standardized by individual level standard deviations to derive beta coefficients.

e. Equivalent to the $\bar{R}^2$ one would observe regressing individual current occupational status on independent variables plus dummy variables representing family membership.

are similar to the characteristics measured by self-assessed leadership quality and reports of high school leadership roles in the Project Talent 11-Year Follow-up data. However, more detailed analyses of the Kalamazoo data show that Executive Ability has no significant or appreciable effect among men categorized as managers (results not shown). The largest effect is found among men classified as salesmen. Salesmen include, for example, men working in insurance, real estate, stocks and bonds, and as sales representatives for manufacturing and wholesaling firms. Thus we suspect that Executive Ability reflects qualities of persuasion, which is, of course, one attribute of leadership. But, evidently, classroom leaders who became managers found their abilities of no special advantage in competition with other managers. This finding is consistent with the stress on bureaucratic rather than personal rule within modern firms (see Edwards, 1979).

Somewhat surprisingly, Executive Ability significantly affects the earnings of blue-collar respondents at the 0.10 level (results not shown), and the effect is not reduced appreciably when a variable representing foreman status is controlled. Because the effect is small compared to the effect among salesmen we do wish to stress its impact. More accurate measurement of supervisory duties could possibly alter our finding by reducing the effect to insignificance.

On average, an additional year of schooling raises earnings in our sample by $(e^{0.0757} - 1) = 7.9$ percent (see Equation 2). Controlling our measures of personality characteristics barely reduces the apparent effect of education (see Equation 4). Controlling test scores, on the other hand, reduces it by 17 percent (compare Equations 2 and 5). If we correct our data for inaccuracies of measurement in a manner similar to the way Bowles and Gintis correct theirs, we find that 25 percent of the effect of education

disappears when test scores are held constant.[21] If the usual interpretation concerning these kinds of results is made, we must conclude that the relationship between schooling and income is unrelated to personality characteristics displayed and formally evaluated in secondary school, but is related in some measure to cognitive differences measurable as early as sixth grade.[22] Whether the skills measured by standardized tests in any necessary way relate to the technical requirements of jobs or whether they in any rational way measure merit are not questions our data can answer. Our results do suggest, however, that Bowles and Gintis are premature in rejecting the empirical implications that the "technocratic-meritocratic" model holds for the role of cognitive ability, and that they would more fruitfully question the interpretive and explanatory premises on which the model rests.

Consistent with this point of view and also contrary to the expectations of Bowles and Gintis (1976:121-122), we find that differences in cognitive skill have substantial direct effects on earnings, even when family background, educational attainment, and Executive Ability are held constant. We would expect that a difference in test scores of one standard deviation (i.e., 15 points) among brothers with the same amount of schooling and the same rating on Executive Ability would be associated with a 17 percent difference in earnings (see Equation 10). If the brothers also happened to hold jobs of the same occupational status, we would expect a test score difference of 15 points to be associated with a 14 percent difference in earnings (see Equation 12). Evidently, tests given to sixth graders can measure characteristics which have substantial economic value to adults. Whether this is because individuals with high test scores are more productive in whatever jobs they hold, or because "brighter" men are placed in charge of others, or for some other reason, we do not know.

Summary

Our analyses provide little support for the correspondence theory as it is is advanced by Bowles and Gintis. Our evidence suggests that schools may well assign scholastic rewards in ways similar to those Bowles and Gintis outline, but that they are not linked to economic structures and rewards in the precise ways depicted in Schooling in Capitalist America. High school grades do not differentiate successful from unsuccessful men with the same amount of schooling; men judged highly cooperative in school receive better grades but enter lower-status occupations; the apparent effects of educational attainment on economic success persist even when measures of personality are controlled; the effects of education on earnings can partially be explained by the association of attainment with cognitive skills; variations in cognitive skill are associated with significant differences in earnings; and our one measure of personality associated with higher earnings is unrelated to higher grades. We conclude that the correspondence between schooling and work at the level of individual differences is in need of far better specification than Bowles and Gintis or we have given it.

Our negative findings may be attributable to inadequate and unreliable measurement of the characteristics whose effects we investigated. Certainly, research with reliable longitudinal measures of personality traits should be undertaken before we prematurely abandon Bowles and Gintis's model. We do not feel, however, that our data provide a significantly weaker test of their model than do the data upon which they rely.

Future research should also consider informal as well as formal rewards both in school and at work. Descriptions of covert and overt student communication, activity, and status systems and of informal groups at the workplace suggest that the correspondence between school and work may be greatest between

informal spheres (see, for example, Homans, 1950; Coleman, 1961; Cusick, 1973; Levy, 1970; and Willis, 1977).

Future research should specify in far greater detail the similarities and differences between the nature of tasks and the structure of authority in school and at work. For example, schoolwork is largely cognitive and solitary (even when pursued in a classroom), while adult work is largely physical or interpersonal. At school, the child's "boss" is not accountable to the same kind of production or profit crieteria as is the worker's boss. With some exceptions (e.g., patrol duty, the exemption of honors students from study hall attendance), students of the same age do not vary in their authority or privileges. This changes among adults. Differences such as these call into question the view that school prepares individuals for work by being like work.

Finally, far greater attention must be given to the mechanisms by which the empirical relationships we can identify arise, for it is on the basis of these mechanisms rather than on the basis of the statistical relationships per se that we must make our interpretations and ground our understandings. For example, if "industriousness" raises grades solely through extra credit work, we would interpret its functions and consequences differently than if it raises grades by enhancing mastery and learning. If schooling is a prerequisite for occupational access because it defines and empowers status groups and not because it is a technically necessary mode of preparation, we would question its "meritocratic" function no matter how equally available it was (for arguments in this vein, see Collins, 1979). Similarly, until we know how IQ raises earnings, we cannot adequately assess its role in differentiating individuals. If the distinctions between mental and manual work or planning and execution fundamentally derive from the imperatives of maintaining capitalist control of production and not from inherent technical

imperatives maximizing efficiency (see Braverman, 1974; Stone, 1975; Friedman, 1977; and Edwards, 1979), then the association between IQ and earnings may be interpreted as an artifact of institutionally determined patterns of dominance and control. Unlike Bowles and Gintis, we believe that the empirical relationships advanced by the liberal, technocratic model cannot be definitively disproven (see Olneck and Crouse, 1979). We do not believe, however, that the explanations advanced for these relationships need be those posited by the model. Arguing exclusively about the empirical relationships may imply acceptance of the model's explanation in the event they prove true. This is not a position we would welcome if, in fact, alternative interpretations of the same results are credible.

NOTES

[1]When referring to students in the same school, Bowles and Gintis stress the importance of differences among curriculum tracks. The data with which they assess their theory, however, do not include information about differences among tracks. Nor do the data which we introduce below. Instead, we will ask simply whether one high school rewarded its blue-collar pupils for personal characteristics different from those for which it rewarded its white-collar pupils. The extent to which we will be testing for differences among tracks is uncertain.

[2]Smith (1967) controls high school rank, high school credits, measures of academic aptitude, and fifteen items from the Edwards Personal Preference Scale when relating personality factors to college grades. In his 1969 work analyzing the grades of nursing students and Spanish-speaking high school students, he introduces no controls and relies on zero-order correlations. Consequently, we ignore that work here. We do not have Smith (1970), so cannot comment on it.

[3]This same problem characterizes Bowles and Gintis's presentation of the results from Peter Meyer's study of the determinants of grades in a New York State high school (see Meyer, 1972). Bowles and Gintis write "[a]s we expected, the cognitive scores provided the best single predictor of grade-point average. . . . But the sixteen personality measures possessed nearly comparable predictive value, having a multiple correlation of 0.63 compared to 0.77 for the cognitive variables" (1976:136). From information in the text and footnotes (1976:136, 320-321), we constructed a path model relating GPA to ability and personality composites in Meyer's data. The standardized (beta) coefficient for ability is 0.65, compared to 0.47 for the personality factor. Adding

ability to personality raises R^2 by 0.39, while adding personality to ability raises R^2 by only 0.20.

[4]Olneck (196) and Mueser (1977, 1979) utilize the personality measures available in the Kalamazoo data, but neither considers grades as a dependent variable, and neither implements satisfactory strategies to cope with the high collinearity among some of the personality variables or to identify interactions of substantive interest.

[5]There are complete data on these measures, as well as on background variables, test scores, and outcomes of interest, for 389 respondents. For those cases missing a rating on Industriousness, the rating on Perseverance was substituted. For those cases missing a rating on Cooperativeness, ratings on Dependability, Emotional Control, or Integrity were substituted according to availability. For those cases missing a rating on Executive Ability, the rating on Initiative was substituted. These substitutions allowed us to analyze from 400 to 420 cases, varying according to dependent variable.

We rejected the initially tempting strategy of factor analyzing the personality ratings and constructing factor scores to represent composite measures. Constructing orthogonal factors does violence to patterns of association known to exist among the separate variables comprising the factors, and oblique factor solutions require arbitrary decisions specifying the degree of acceptable collinearity among the factors. Moreover, factor scores do not exist on an interpretable metric. We would prefer to speak of the advantage of being the sort of person judged Above Average, however imprecise that may be, than to speak of the advantage of being one standard deviation above the mean on an artificially constructed composite. We did, however, rely on factor analysis to determine which ratings might substitute for

others in the event of missing data.

Our reliance on just four personality measures did not lead us for any particular dependent variable to understate the (corrected) explanatory power of all nine of the ratings taken together by more than 0.008, and it obviates our need to invent post-hoc explanations for poorly estimated effects. Such explanations may reflect nothing more than the vicissitudes of interpreting results from a small sample in which high multicollinearity is present.

[6]Bowles and Gintis (1976:309) show that in Meyer's study of high school seniors, English grades and total grade point average have similar correlations with measures of personality. Mueser (1979:138) reports that in the Project Talent 11-Year Follow-up sample, high school juniors' grades in history and social studies predict later success better than English marks or average grades do. These results suggest that our analyses of the determinants of grades may generalize to the wider population, but that we may somewhat underestimate the later effects of grades. Mueser does not relate grades to the Project Talent personality measure (for details on the Project Talent sample, see Crouse, 1977).

[7]To identify significant interactions with white-collar and blue-collar origin, we first ran separate regressions, and then pooled the sample, constructing relevant interaction terms. We also tested multiplicative interactions between test scores and the personality measures, and among the personality measures.

[8]This result is consistent with Collins's (1979:21) conclusion, based on Sexton's (1961) work, that the "sheer amount of school work done seems to be the best predictor of high grades, with the highest grades reserved for work done in amounts beyond what is asked for."

[9]For evidence that teachers' pedagogical approaches are varied in accordance with the social class of their students, see Keddie (1971).

[10]For an interpretation of scholastic aptitude as a form of "cultural capital," see Bourdieu (1974).

[11]Though not exactly comparable, our results are consistent with those of Sewell and Hauser (1975:98, 101-105), who investigate social psychological factors influencing attainment.

[12]To test this hypothesis indirectly, we correlated Industriousness with test scores separately by English mark. For men with A's and B's the correlation is +0.117, for men with C's it is +0.024, and for men with D's and F's it is -0.089. While Industriousness does not behave exactly as our hypothesized motivational variable would--in that it is correlated positively with test scores for men with C's, B's, and A's, the pattern of results is in the expected direction.

[13]Among 226 brothers, with English marks controlled, the coefficient for test scores in an equation predicting Industriousness is +0.0002. Within families, the analogous coefficient is +0.004. This is consistent with our expectation that for brothers with the same grades unmeasured motivation and test scores are less negatively correlated than among unrelated individuals.

[14]Calculated from data on men 35 to 44 years old, i.e., the sample on which Bowles and Gintis principally rely. See Bowles and Gintis, 1976, p. 293, for correlations on which we based path models incorporating measured background and educational attainment.

[15]We reanalyzed data from the Project Talent 11-Year Follow-up, which include a measure of occupational plans as of eleventh grade (see Crouse,

1977), and from Sewell and Hauser's (1975) sample of 1957 Wisconsin high school seniors, which include a measure of occupational aspirations. Controlling occupational plans in the Project Talent sample reduces the standardized regression coefficient of father's education in an equation predicting son's education from 0.223 to 0.193 and the coefficient of father's occupation from 0.223 to 0.183. If we first control ability and grade point average, introducing occupational plans reduces the coefficient of father's education from 0.135 to 0.128, and of father's occupation from 0.112 to 0.100. In the Wisconsin data, controlling only occupational aspirations reduces the coefficient of father's education from 0.221 to 0.160, and of father's occupation from 0.193 to 0.120. If grade point average and test scores are first controlled, the reductions are 0.140 to 0.125 and 0.148 to 0.118, respectively.

[16]In Equation 3, the sum of the absolute values of the standardized coefficients for background measures is 0.551. In Equation 4, it is 0.471. This sum represents the expected advantage of an individual who ranks one standard deviation above the mean on each of the background variables.

[17]Our result agrees with the findings from other studies reviewed by Collins (1979:19-20). Bowles and Gintis (1976:140) also claim that grades cannot be expected to predict economic success well, with the possible exception that through their tie to personality measures, grades might differentiate the success of men in the same job. We cannot adequately test this contention because the of small sample size in any one job.

[18]The high statistical significance of the IQ*POPWHCOL term in Equation 7 in Table 5 refers to the significance of the <u>difference</u> between the coefficients for white-collar and blue-collar sons. In the sample of

white-collar sons, the F value for the coefficient of test scores with education and the personality variables controlled is 3.36, falling short of the 0.05 level, but above our 0.10 level criterion. In a larger sample of Kalamazoo white-collar sons, for which personality data are not necessarily available, the F value for the significance of test score effects on initial occupational status is less than 2.00 (Olneck, 1976:222). Because the significant effect of test scores in the present sample is not produced by the introduction of the personality measures (i.e., it is not the consequence of suppressor effects), we may best conclude that it is the result of sampling error.

[19]To maintain comparability with Bowles and Gintis, we have treated the effects of education as if they were linear. They are not. Four years of higher education raise initial and current occupational status by a greater amount than do four years of secondary education. The apparent percentage effects of higher education on earnings in the Kalamazoo sample are lower than the effects of secondary schooling, but this pattern is reversed when test scores and family background are controlled. Controlling personality measures does not change the estimates of the effects of education when nonlinear specifications are employed (see Olneck, 1979).

[20]The absence of a significant effect of father's occupation on current occupational status in the Kalamazoo results is discrepant with the results from larger, nationally representative samples (see Featherman and Hauser, 1978:337, and Jencks et al., 1979:332-333). The same is true with respect to earnings (see Featherman and Hauser, 1978:368, and Jencks et al., 1979: 336-337). These discrepancies are, in part, caused by the absence of blacks and farm sons, and by a probable upward bias in the proportion of higher-status

managers. The possibility that Kalamazoo was more "meritocratic" than the nation at large cannot be eliminated. Measurement error does not account for the differences.

[21] Bowles and Gintis's conclusion that controlling for cognitive skills does not reduce the relationship between schooling and economic success (1976:110-114, 315-317) derives from their reliance on a sample of relatively young veterans. Jencks (1977) demonstrates that this sample does not adequately represent the cohorts from which it is drawn. More importantly, Bowles and Gintis assume that the relationship between tested ability and earnings does not change with age. But in the very sample on which they rely the correlation is appreciably larger for men aged 30 to 34 than it is for men 25 to 29, and longitudinal data show the same pattern (see Hause, 1972; Fägerlind, 1975; Hauser and Daymont, 1977). The Kalamazoo data show no systematic age-related changes in the association between test score and earnings, but the sample does not include men under 35

[22] An alternative interpretation is that employers <u>are</u> concerned with the behavior characteristics schools evaluate, but do not have ready access to either those evaluations or alternative measures. Consequently they turn to education as a rough approximation. Such an approximation can substantially reduce an employer's probability of selecting an individual who is especially low on a valued characteristic and maximize the chances of selecting an individual who is especially high. For example, while 33 percent of the Kalamazoo respondents who completed high school but went no further were rated Below Average on Executive Ability, only 14

percent of the men finishing their schooling with a B.A. were rated Below Average. Almost a quarter of the college graduates were rated Above Average, compared to only 4 percent of the high school graduates. Despite the fact that the percentage of men rated Average was virtually identical in the two groups (i.e., 62 percent for the high school graduates and 63 percent for the college graduates), an employer interested in Executive Ability could rationally hire and promote only college graduates. There are two problems with this interpretation. One is that it fails to explain why employers do not find direct measures for the characteristics they value. (One possibility is that the ethos of equal opportunity sanctions the use of schooling as a criterion for economic reward because education is available to all, while the widespread direct measurement of cognitive or noncognitive traits might imply fixed barriers and provoke resentment.) A second problem is that such an interpretation precludes eliminating <u>any</u> characteristic with which educational attainment is associated as the explanation for schooling's effect on economic success.

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